OPERATION AND PARTS MANUAL

MULTIQUIP®

MODELS
ST2037F
ST2040TF
SUBMERSIBLE PUMP WITH FLOAT SWITCH

Revision #3 (12/14/17)

To find the latest revision of this publication, visit our website at: www.multiquip.com

THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

GENERAL SAFETY

⚠ CAUTION

- **NEVER** operate this equipment without proper protective clothing, shatterproof glasses, respiratory protection, hearing protection, steel-toed boots and other protective devices required by the job or city and state regulations.

- Avoid wearing jewelry or loose fitting clothes that may snag on the controls or moving parts as this can cause serious injury.
- **NEVER** operate this equipment when not feeling well due to fatigue, illness or when under medication.

- **NEVER** operate this equipment under the influence of drugs or alcohol.

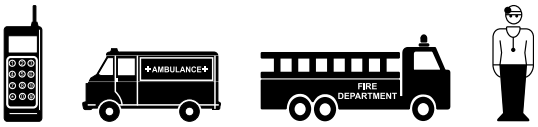
- **ALWAYS** clear the work area of any debris, tools, etc. that would constitute a hazard while the equipment is in operation.
- No one other than the operator is to be in the working area when the equipment is in operation.
- **DO NOT** use the equipment for any purpose other than its intended purposes or applications.

NOTICE

- This equipment should only be operated by trained and qualified personnel 18 years of age and older.
- Whenever necessary, replace nameplate, operation and safety decals when they become difficult read.
- Manufacturer does not assume responsibility for any accident due to equipment modifications. Unauthorized equipment modification will void all warranties.
- **NEVER** use accessories or attachments that are not recommended by Multiquip for this equipment. Damage to the equipment and/or injury to user may result.
- **ALWAYS** know the location of the nearest **fire extinguisher.**

- **ALWAYS** know the location of the nearest **first aid kit.**

- **ALWAYS** know the location of the nearest phone or **keep a phone on the job site.** Also, know the phone numbers of the nearest **ambulance, doctor** and **fire department.** This information will be invaluable in the case of an emergency.



PUMP SAFETY

⚠ DANGER

- **NEVER** operate the equipment in an explosive atmosphere or near combustible materials. An explosion or fire could result causing severe **bodily harm or even death.**

⚠ WARNING

- Accidental starting can cause severe injury or death. **ALWAYS** place the ON/OFF switch in the OFF position.
- **DO NOT** place hands or fingers inside pump when pump is running.
- **NEVER** disconnect any **emergency or safety devices.** These devices are intended for operator safety. Disconnection of these devices can cause severe injury, bodily harm or even death. Disconnection of any of these devices will void all warranties.
- **Risk of Electric Shock** - Do not enter the pool or spa if the pump is operating.

⚠ CAUTION

- Be careful of discharge hose whipping under pressure.
- **ALWAYS** check pump oil level only when pump is cool. Expansion due to heat may cause hot oil to spray from the oil plug when the oil plug is removed. The possibility of severe scalding may exist.

NOTICE

- **ALWAYS** place the pump in an upright position on a platform before using. The platform will prevent the pump from burrowing itself on soft sand or mud.
- **NEVER** operate pump on its side.
- **DO NOT** allow the pump to freeze in water.
- **NEVER** leave an open pump chamber unattended.
- **ALWAYS** keep the machine in proper running condition.
- **DO NOT** attempt to thaw out a frozen pump by using a torch or other source of flame. Application of heat in this manner may heat the oil in the seal cavity above the critical point, causing pump damage.
- **DO NOT** pump water with a temperature greater than 140°F (60°C).
- **DO NOT** pump liquids containing acid or alkali.
- **ALWAYS** check strainer before pumping. Make sure strainer is not clogged. Remove any large objects, dirt or debris from the strainer to prevent clogging.
- **ALWAYS** use a large basket strainer when pumping water that contains large debris.
- **ALWAYS** flush pump (clean) after use when pumping water concentrated with heavy debris. It is very important to always flush the pump before turning it off to prevent clogging.
- Fix damage to machine and replace any broken parts immediately.
- **ALWAYS** store equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of the reach of children and unauthorized personnel.
- **NEVER** lubricate components or attempt service on a running machine.
- **NEVER** run pump ***dry***.
- **ALWAYS** allow the machine a proper amount of time to cool before servicing.
- Keep machine in proper running condition.

ELECTRICAL SAFETY

⚠ DANGER

- The electrical voltage required to operate pump can cause severe injury or even death through physical contact with live circuits. **ALWAYS** disconnect electrical power from pump before performing maintenance on pump.

WARNING

- To reduce the risk of electric shock, connect to a circuit protected by a Ground-Fault Circuit-Interrupter (GFCI).
- **Risk of Electric Shock** - This pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of electric shock, be certain that it is connected only to a properly grounded, grounding-type receptacle.

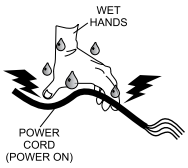
NOTICE

- **ALWAYS** make certain that the voltage supplied to the pump is correct. Always read the pump's nameplate to determine what the power requirements are.

Power Cord/Cable Safety

⚠ DANGER

- **NEVER** stand in water while AC power cord is connected to a live power source.
- **NEVER** use **damaged** or **worn** cables or cords. Inspect for cuts in the insulation.
- **NEVER** grab or touch a live power cord or cable with wet hands. The possibility exists of **electrical shock, electrocution or death.**



- Make sure power cables are securely connected to the motor's output receptacles. Incorrect connections may cause electrical shock and damage to the motor.

⚠ WARNING

- **NEVER** attempt to use the power cord as a lifting or lowering device for the pump.

NOTICE

- **ALWAYS** make certain that proper power or extension cord has been selected for the job. See Cable Selection Chart in this manual.

Grounding Safety

⚠ DANGER

- **ALWAYS** make sure pump is grounded.
- **NEVER** use gas piping as an electrical ground.
- **ALWAYS** make sure that electrical circuits are properly grounded to a suitable earth ground (ground rod) per the National Electrical Code (NEC) and local codes before operating generator. **Severe injury or death by electrocution** can result from operating an ungrounded motor.

Control Box Safety

⚠ DANGER

- **ALWAYS** have a qualified electrician perform the control box installation. The possibility exists of electrical shock or electrocution.

NOTICE

- **ALWAYS** mount control box in a vertical position protected from harsh environmental elements.

LIFTING SAFETY

⚠ CAUTION

- When raising or lowering of the pump is required, always attach an adequate rope or lifting device to the correct lifting point (handle) on the pump.

NOTICE

- **NEVER** lift the equipment while the electric motor is running.

TRANSPORTING SAFETY

NOTICE

- **ALWAYS** shut down pump before transporting.
- **ALWAYS** tie down equipment during transport.

ENVIRONMENTAL SAFETY/DECOMMISSIONING

- **DO NOT** pour waste or oil directly onto the ground, down a drain or into any water source.

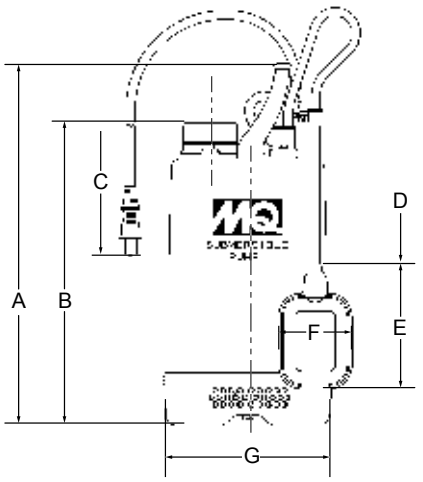
- Contact your country's Department of Public Works or recycling agency in your area and arrange for proper disposal of any electrical components, waste or oil associated with this equipment.
- When the life cycle of this equipment is over it is recommended that the pump casing and all other metal parts be sent to a recycling center

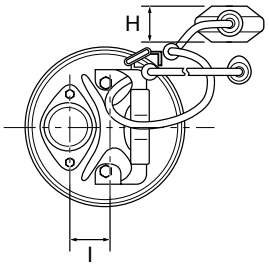
  Metal recycling involves the collection of metal from discarded products and its transformation into raw materials to use in manufacturing a new product.

  Recyclers and manufacturers alike promote the process of recycling metal. Using a metal recycling center promotes energy cost savings.

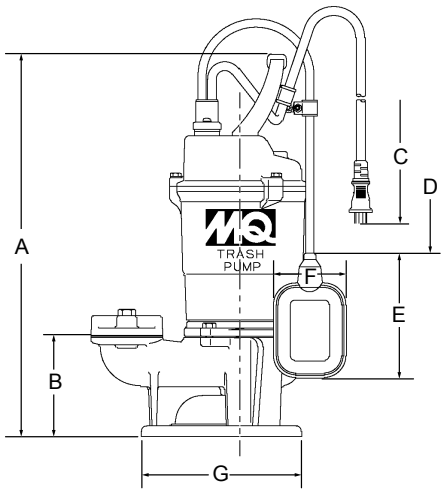
Table 1. Specifications (Pump)		
Model	ST2037F	ST2040TF
Type	Centrifugal Submersible Pump	Centrifugal Submersible Pump
Impeller	Nitorile Rubber over Steel	Nitorile Rubber over Steel
Suction & Discharge Size	2.00 in. (50 mm)	2.00 in. (50 mm)
Maximum Pumping Capacity	73 gallons/minute (272 liters/minute)	79 gallons/minute (299 liters/minute)
Max Head	37 ft. (10.6 meters)	40 ft. (11.4 meters)
Power	1 HP (0.75 kW)	1 HP (0.75 kW)
Voltage Phase	1Ø 115V	1Ø 115V
Starting Amps	25	25
Running Amps	6.9	6.8
Thermal Overload Protection	YES	YES
Rotation	CCW (Note 1)	CCW (Note 1)
Mechanical Seal Oil Capacity	120 cc. (Note 2)	133 cc. (Note 2)
Check Frequency	Monthly (300 hrs.)	Monthly (300 hrs.)
RPM (Speed)	3390 +/- 30	3390 +/- 30
Power Cable Length	25 FT. (7.6 m.)	25 FT. (7.6 m.)
Dry Net weight	31 lb (14 kg)	33 lb (15 kg)

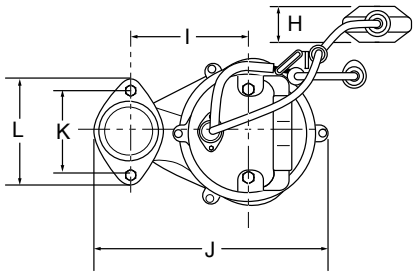
1. **Motor Rotation** — Upon start-up, the pump "kicks" in the opposite direction of motor rotation. The correct rotation is counterclockwise (CCW) as viewed from the impeller end of the pump.
2. **Mechanical Seal Oil** — Use a good grade 10 weight non-detergent hydraulic oil (i.e. Shell Turbo 32 or equivalent). Fill oil cavity 75% to 85% full (allow air space for expansion).





ST2037F





ST2040TF

Figure 1. Dimensions

Table 2. Dimensions

	ST2037F	ST2040TF
A	15.82 in. (402 mm)	16.8 in. (427 mm)
B	13.26 in. (337 mm)	4.37 in. (111 mm)
C	25 ft. (7.6 m)	7.08 in. (180 mm)
D	15.74 in. (400 mm)	15.74 in. (400 mm)
E	5.51 in. (140 mm)	5.51 in. (140 mm)
F	3.23 in. (82 mm)	3.23 in. (82 mm)
G	7.48 in. (190 mm)	7.08 in. (180 mm)
H	1.63 in. (41.5 mm)	1.63 in. (41.5 mm)
I	1.65 in. (42 mm)	5.11 in. (130 mm)
J	—	10.03 in. (255 mm)
K	—	3.54 in. (90 mm)
L	—	4.52 in. (115 mm)

The Multiquip Model ST2037F and ST2040TF submersible pumps with a float switch are designed to pump water automatically. They are used for the draining (dewatering) of well casings construction sites, cofferdams, manholes, transformer vaults and excavations and are acceptable for indoor and outdoor use.

A Nitorile rubber over steel impeller is attached to the output shaft of a 1HP electric motor which provides adequate power for general purpose pumping. This submersible pump is supplied completely with an electric power cable which is equipped with a float switch and a discharge port located on top or on one side of the pump which accepts a 2-inch hose.

This pump is ideal for portability because of its light weight and carrying handle. For reliability and long life, a mechanical seal provides shaft sealing, with an oil chamber separating the pump section from the motor.

The pump when in use, should be installed as free standing (upright position) on its strainer base. A 2-inch discharge hose (not supplied) should be connected to the discharge port located on top or one side of the pump. The discharge hose should be adequately supported to avoid stress on the pump.

For maximum water flow, the discharge hose should be kept as short as possible, and with minimum elevation above the pump.

Remember, as the length and/or height of the discharge hose is increased, the flow of water will be reduced. Also any reduction in the hose size, and any fittings such as valves or outlet nozzles, will restrict the water flow.

To avoid back-siphonage when the pump is switched off, ensure that the end of the discharge hose is installed above the water level at the final discharge point.

When the pump is switched off, the water remaining in the hose will run back through the pump. This can be avoided by placing a non-return valve in the hose nearest the pump.

NEVER use this submersible pump to pump flammable liquids or operate in a explosive or flammable environment.

Avoid using this pump in conditions where mud, grit, silt or other debris are present. These conditions could cause blockage and cause excessive pump wear.

DO NOT install the pump directly into an area where there is a heavy buildup of mud, grit, silt, or debris. if this condition is present, install the pump on a platform before operating.

This pump must always be positioned on a platform in an upright position. NEVER operate the pump by a suspended rope. To prevent large solids from entering the pump, install a wire mesh screen or similar barrier around the pump.

If the pump was used to pump water containing mud, silt, use clean water to flush out the pump after each use.

DO NOT allow the pump to run dry, as this will damage the pump. During maintenance, dry running is permissible but only for a few seconds.

NEVER lift the pump by its electrical power cord. **ALWAYS** lift the pump by its carrying handle or attach a rope to the carrying handle.

A pump fully submerged pump in liquid will not freeze, unless the liquid freezes. **DO NOT** allow a partially submerged pump to freeze. The expansion of water freezing in the volute may crack the pump, causing expensive repairs. If there is any danger of the pump being subjected to freezing temperatures, lift the pump from water and allow it to drain thoroughly.

If the pump jams or the pump rotor locks for any reason, disconnect the pump from the power source immediately.

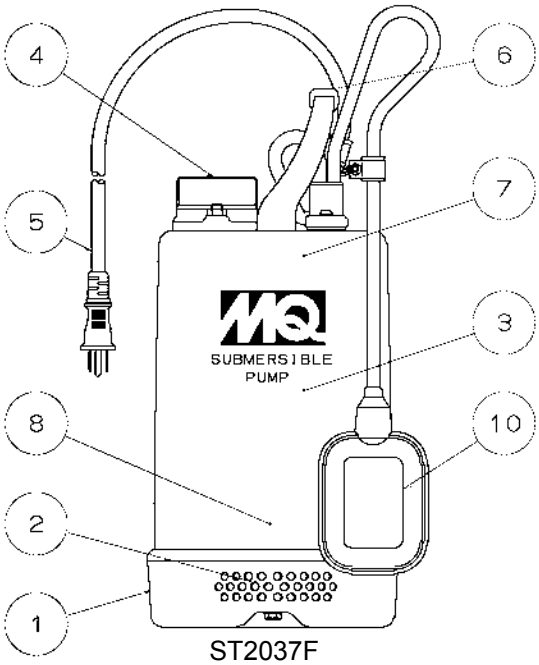
Allowing the pump motor to cycle ON and OFF under an overload condition can burn out the motor.

When replacement of nuts and bolts is required, use only recommended parts as referenced in the parts section of this manual. This pump uses metric threads. **DO NOT** use English measurement threads.

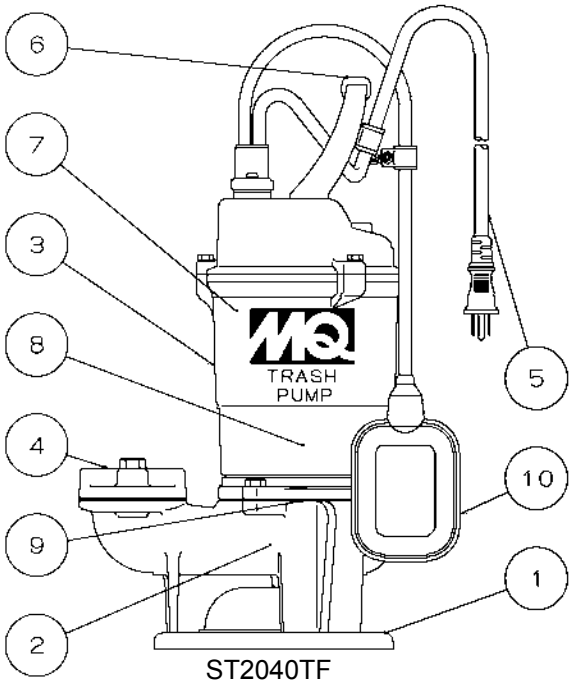
Failure to follow the above referenced precautions could result in serious injury or death! Replace pump cord immediately if cord becomes damaged or severed. This pump must be installed in accordance with National Electric Code ANSI/NFPA 70 so as to prevent moisture from entering or accumulating with the boxes, conduit bodies fittings, float housing or cable.

⚠ WARNING

Explosion or Fire Hazard exists if this pump is used with flammable liquids. DO NOT use this pump with flammable liquids. DO NOT install this pump in hazardous locations as defined by the National Electrical Code, ANSI/NFPA 70.



ST2037F



ST2040TF

Figure 2. ST2037F/ST2040TF Pump Components

Figure 2 shows the location of the basic components, for the ST2037F and ST2040TF submersible pumps with a float switch.

Listed below is a brief explanation of each component.

1. **Strainer Base** — This strainer base is made of electrocoating steel which is resistant to hardware corrosion. **DO NOT** pump large objects or debris with this pump. This pump is for pumping water only. For dewatering purposes, always place the strainer base on a platform.
2. **Volute/Impeller** — Impellers are constructed of Nitorile Rubber to minimize wear and prolong service life.
3. **Electric Motor** — These submersible pumps utilize a 60 Hz, single-phase, 115 VAC, 1 HP electric motor. Consult with a licensed electrician before connecting motor to a power source. Observe all city and local safety codes.
4. **Discharge Port** — Connect a 2-inch hose to this port. Remember to adequately support the discharge hose to avoid stress on the pump.
5. **AC Power Cable** — This unit is supplied with a 25 ft. (7.6 meters) AC power cable which is equipped with a float switch. Always check the cable for signs of wear **NEVER** use a defective power cable. Replace the cable immediately if the cable is worn or defective.
6. **Carrying Handle** — Always carry the submersible pump by its handle. **NEVER** carry the pump by its power cord. Carrying or lifting the pump by the power cord, will cause undue stress on the cord, and ultimately the cord will become dislodged from the pump.
7. **Thermal Overload Protection** — This pump is equipped with a thermal overload protection device that will shut down the motor in the event of high operating temperatures. The motor will automatically restart once the temperature returns to an acceptable operating temperature.
8. **Mechanical Seal Oil** — This oil filled seal provides lubrication when running the pump dry. **NEVER** run the pump dry. Running the pump dry will cause severe damage to the pump.
9. **Mechanical Seal Oil Plug** — Remove this plug to check and add hydraulic oil (Shell 32 or equivalent) to the oil cavity. This oil protects the mechanical seal. Oil cavity should be full enough to cover seal spring.
10. **Float Switch** — This float switch employs a micro-type switch for the switching operation. Be certain that the float switch cannot hang up or foul in its swing.

FLOAT SWITCH THEORY

The float switch allows the pump to start and stop automatically when a prefixed liquid (water) level has been reached. A multiple closure device makes it highly reliable. This is the most universally-used float switch in the world for the automation of pumps.

HOW IT WORKS

This float switch is an economical chamber design float-type, liquid level switch that uses a microswitch for switching operation. As the liquid level (water) rises or falls, the float changes its angle until the microswitch makes or breaks the pump. The maximum switch angle range is 90 degrees. See Figure 3 below.

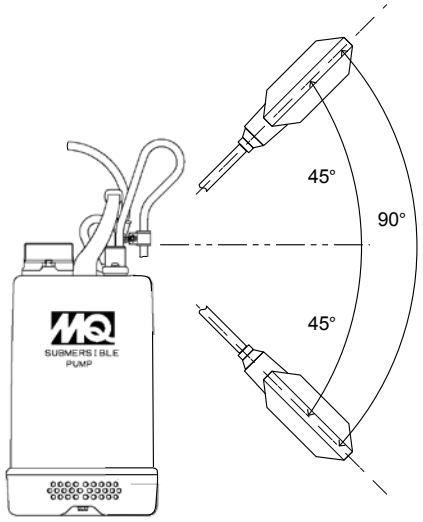


Figure 3. Switch Angle Range

DESIGN FEATURES

The float switch employs a microswitch and a latching ball for the switching operation. The latching ball design provides excellent resistance to nuisance trips due to fluid turbulence. The case and cable are hermetically sealed via re-injection molding.

- Suitable for most liquid environments.
- Hermetically sealed.
- Thick-walled non-corrosive Polypropylene enclosure.
- Max depth level, 1bar
- Micro witch mechanical life - 10,000,000 operations

PUMPING RANGE

The pumping range of the pump is determined by the float switch tether cord. The length of the float switch tether code is set to 150 mm at the factory. Please set the tether length to within 150 mm to prevent an improper operation.

Refer to Figure 4 for the pumping range of the ST2037F and ST2040TF. The minimum submergence level should never be less than 150 mm for the ST2037F or 160 mm for the ST2040TF above the pump bottom.

Pumping ranges are based on non-turbulent conditions. Range may vary due to water temperature and cord shape.

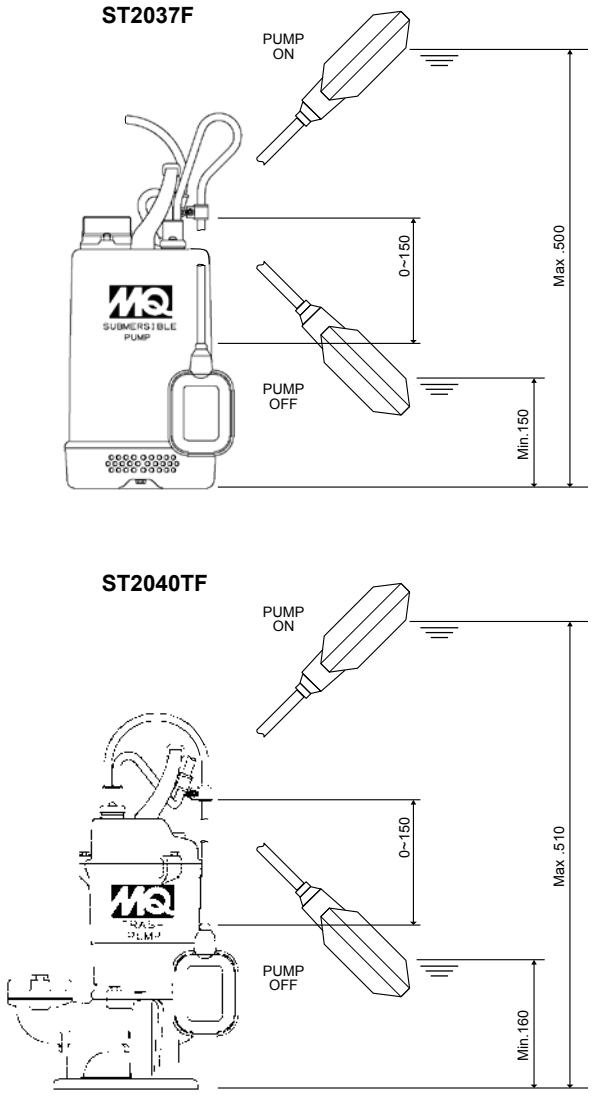


Figure 4. Pumping Range (Float Switch)

ADJUSTING FLOAT SWITCH

1. Determine the required cord tether length as shown in Figure 4.
2. Loose a screw, cord clamp and float cord band on the float switch
3. Shift the float cord band to the required cord tether length ,then tighten the screw, cord clamp and float cord band.

⚠ CAUTION

When Installing the float switch, keep enough space around the float switch to avoid an improper operation.

SINGLE-PHASE POWER INSTALLATION (INPUT)

1. All submersible pumps referred to in this manual require 115 VAC, 60 Hz., single-phase power for normal operation.
2. If you cannot determine what your pump's power requirements are, look at the vendor supplied identification name tag attached to the pump or contact Multiquip's Technical Support Department.

⚠ CAUTION

Applying incorrect power (voltage phasing) to the submersible pump can cause severe damage to the pump.

Make sure that the correct voltage and phase are transferred to the pump at all times.

POWER CORD REQUIREMENTS

When routing the 115 VAC, 60 Hz., single phase power via a power cord , **ALWAYS** use the correct wire size. Refer to Table 3 to determine the correct wire size. Incorrect wire size can adversely affect the performance of the pump.

Table 3. Cord Length and Wire Size

AMPS	50 FT	100 FT	150 FT
6	16 AWG	16 AWG	14 AWG
8	16 AWG	14 AWG	12 AWG
10	16 AWG	14 AWG	12 AWG
12	14 AWG	14 AWG	12 AWG
14	14 AWG	12 AWG	10 AWG
16	12 AWG	12 AWG	10 AWG

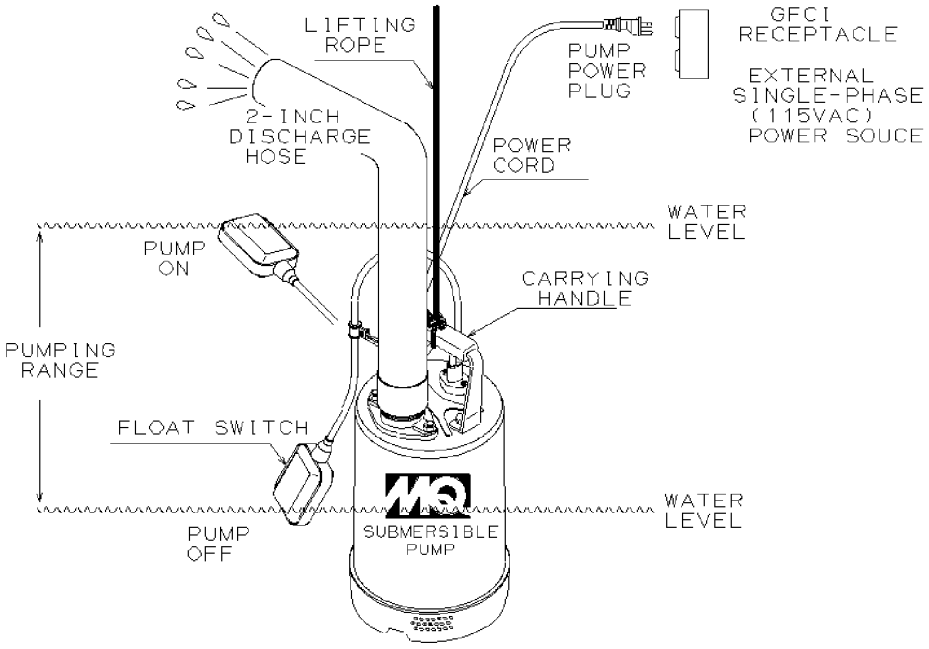


Figure 5. Application Diagram

HOSE CONNECTIONS

1. 1. Connect a 2-inch hose to the discharge port on the pump as shown in Figure 6. Make sure that the hose is attached correctly to the discharge port.

ATTACHING LIFTING ROPE

1. Attach a suitable lifting cable (rope) to the carrying handle (Figure 6) on the pump and lower the pump into place. For applications where there is an excessive amount of mud, grit or silt, the use of a support platform is desirable. When pumping water from applications where there is little or no debris, the support platform is not required.

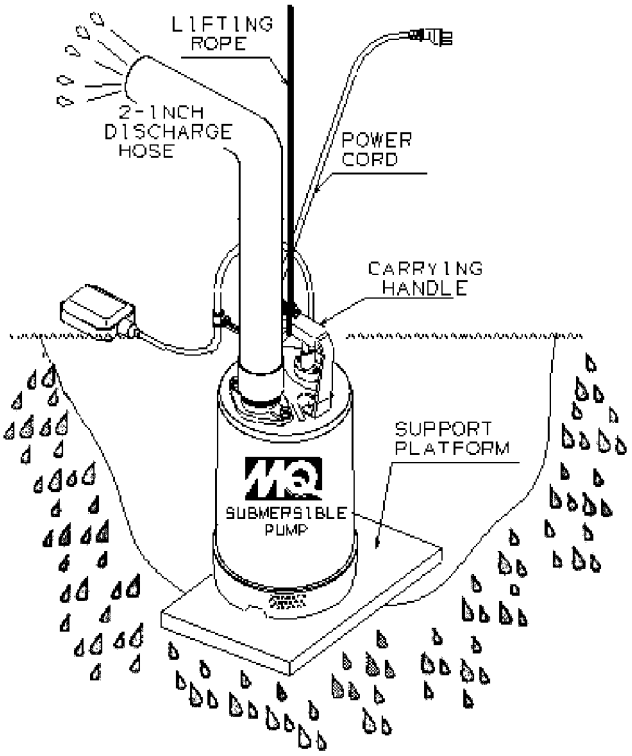


Figure 6. Submersible Pump Upright Position(Correct)

2. Make sure the pump is always placed in an upright position, not tilted (Figure 7). Never position the pump directly on a soft, loose bottom. Remember to attain maximum pumping capacity and prevent excessive wear, position the pump so it will not burrow itself into sand or clay.

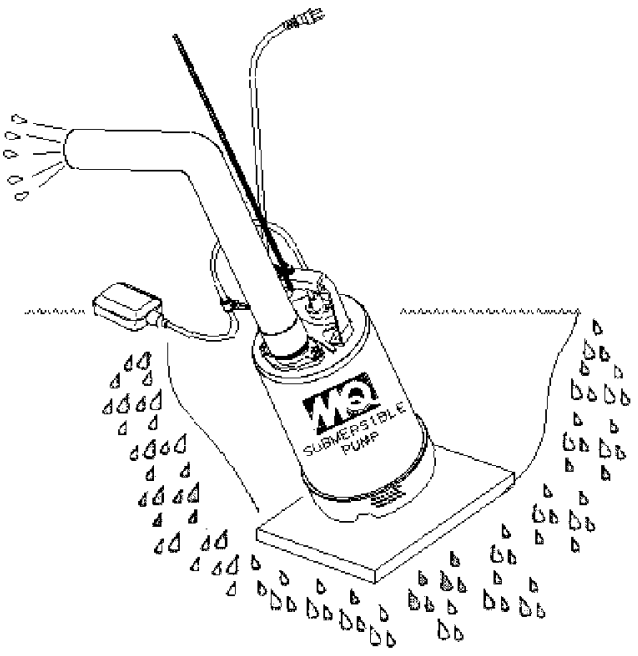
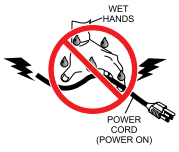


Figure 7. Submersible Pump Upright Position (Incorrect)

3. If all of the pump's electrical requirements have been met, place the circuit breaker or power ON/OFF switch in the ON position.
4. Wait a few seconds and water should begin to flow from the discharge hose.
5. If water is not flowing from the discharge hose or not flowing freely after a few minutes, remove the power from the pump and check the system for leaks.
6. To stop the pump from pumping, place the circuit breaker or ON/OFF switch in the OFF position.

DANGER



NEVER grab or touch a live power cord. **DO NOT** stand in water when connecting the pump's power cord into a voltage source. The possibility exists of electrical shock, electrocution and possibly death!